

WHAT IS CLAIMED IS:

1. A surface acoustic wave filter device having substantially equal input and output impedances, the filter device comprising:

an unbalanced signal terminal;

first and second balanced signal terminals;

2^{n-1} first surface acoustic wave filters connected between the unbalanced signal terminal and the first balanced signal terminal, where n is an integer equal to or greater than 1; and

2^{n-1} second surface acoustic wave filters connected between the unbalanced signal terminal and the second balanced signal terminal;

wherein one of the input and output impedances of each of the first and second filters is approximately four times the other impedance; and

the second surface acoustic wave filters are 180 degrees out-of-phase with respect to the first surface acoustic wave filters.

2. The surface acoustic wave filter device according to Claim 1, wherein each of the first and second surface acoustic wave filters has a plurality of interdigital transducer arranged in a direction in which a surface

acoustic wave propagates and at least one of the interdigital transducers is halved in an electrode-finger interdigitating widthwise direction to define first and second interdigital transducer sections, which are connected in series with each other.

3. The surface acoustic wave filter device according to Claim 1, wherein each of the first and second surface acoustic wave filters has a structure in which a preliminary surface acoustic wave filter having substantially equal input impedance and output impedance is arranged in such a manner that at least one interdigital transducer is halved in an electrode-finger interdigitating widthwise direction to define first and second interdigital transducer sections.

4. The surface acoustic wave filter device according to Claim 3, wherein the preliminary surface acoustic wave filter is a longitudinally-coupled resonator-type surface acoustic wave filter.

5. The surface acoustic wave filter device according to Claim 4, wherein the longitudinally-coupled resonator-type surface acoustic wave filter has three interdigital transducers arranged in a surface acoustic wave propagating direction and a central interdigital transducer or

interdigital transducers at both sides are halved in the electrode-finger interdigitating widthwise direction to define the first and second interdigital transducer sections.

6. The surface acoustic wave filter device according to Claim 1, wherein each of the first and second surface acoustic wave filters has a plurality of interdigital transducers and at least one of the plurality of interdigital transducers is halved in a surface acoustic wave propagating direction to define first and second interdigital transducer sections.

7. The surface acoustic wave filter device according to Claim 6, wherein each of the first and second surface acoustic wave filters has the structure in which a preliminary surface acoustic wave filter having substantially equal input impedance and output impedance is arranged such that at least one interdigital transducer is halved in a surface acoustic wave propagating direction.

8. The surface acoustic wave filter device according to Claim 7, wherein the preliminary surface acoustic wave filter is a longitudinally-coupled resonator-type surface acoustic wave filter.

9. The surface acoustic wave filter device according to Claim 8, wherein the longitudinally-coupled resonator-type surface acoustic wave filter has three interdigital transducers and an interdigital transducer positioned at the center is halved in the surface acoustic wave propagating direction.

10. The surface acoustic wave filter device according to Claim 2, wherein one of the first interdigital transducer section and the second interdigital transducer section is connected to a ground potential.

11. The surface acoustic wave filter device according to Claim 1, wherein each of the first and second surface acoustic wave filters includes interdigital transducers and has a structure in which a surface acoustic wave filter having a plurality of interdigital transducers is constructed such that at least two of the interdigital transducers are connected in series.

12. The surface acoustic wave filter device according to Claim 11, wherein each of the first and second surface acoustic wave filters has a structure in which a preliminary surface acoustic wave filter having substantially equal input impedance and output impedance is arranged such that

at least two of the interdigital transducers are connected in series.

13. The surface acoustic wave filter device according to Claim 12, wherein the preliminary surface acoustic wave filter is a longitudinally-coupled resonator-type surface acoustic wave filter.

14. The surface acoustic wave filter device according to Claim 13, wherein the longitudinally-coupled resonator-type surface acoustic wave filter has three interdigital transducers and the interdigital transducers arranged at both sides in a surface acoustic wave propagating direction are connected in series.

15. A communication apparatus comprising at least one surface acoustic wave filter device according to Claim 1.

16. A communication apparatus according to Claim 15, wherein the at least one surface acoustic wave filter is a band pass filter.